value will be seen in determining the curve of the diurnal variation of the rainfall. We note, with much satisfaction, the continued prosecution of the important inquiry into the chemical climatology of Paris.

METEOROLOGY OF WESTERN AUSTRALIA.—We have recently received a most valuable addition to the meteorology of Australia, which is being so energetically worked out by Messrs. Todd, Ellery, Russell, and Macdonnell, in the form of a first Report of the Meteorology of Western Australia, by Mr. Malcolm Fraser, Surveyor-General for the Colony. The report contains a good summary of a pretty complete set of observations made during the whole of 1876 at Perth, and the barometric means for five months at Point King Lighthouse, on the south coast. The chief results are, for the summer months, mean monthly pressure—29·915 inches, temperature 74°·7, rainfall 0·54 inch, and wind velocity in miles 404; and for the winter months—pressure 30·177 inches, temperature 57°·5, rainfall 4·90 inches, and wind velocity 280 miles. The lowest temperature for the year was 34°·7, and the highest 112°·0, on February 20, and it may be noted that the mean daily maxima for this month was as high as 93°·7. Speaking generally, the winds in summer blow from the sea inland, and in winter from the land seawards, little rain falling in the former season, whereas in the latter season the rainfall is copious but not excessive. The smallest rainfall of any month was 0·04 inch in February, falling on one day, and the largest 8·45 inches in June, falling on nineteen days. It is contemplated to establish stations at Nickol Bay, Champion Bay, and York; but a still further extension of the system is required, not merely for the development of the climatology of the colony, of which we may be said to know next to nothing, but also from the important bearing of the meteorology of Western Australia on that of the whole continent of Australia, particularly on the system of weather warnings for that group of colonies.

OUR ASTRONOMICAL COLUMN

THE URANIAN SATELLITES, ARIEL AND UMBRIEL.—We continue the ephemeris of the two interior satellites of Uranus, making use of Prof. Newcomb's tables in the appendix to the Washington Observations for 1873. The positions and distances are for 9h. Greenwich mean time, when the planet will be near the meridian during the period over which the ephemeris extends; though these are given for every evening, the presence of the moon in this quarter of the heavens may interfere with observation on or about March 16.

	ARIEL.			UMBRIEL.		
	Pos.	°	Dist.	Pos.	°	Dist.
March 8	Pos.	358	Dist. 12″·6	Pos.	312	Dist. 7″·9
9	,,	191	,, 15·2	,,	196	,, 20·6
10	,,	25	,, 12·4	,,	145	,, 9·1
11	,,	241	,, 6·2	,,	18	,, 20·0
12	,,	153	,, 7·4	,,	334	,, 10·6
13	,,	0	,, 13·3	,,	201	,, 19·1
14	,,	193	,, 15·1	,,	161	,, 12·1
15	,,	19	,, 11·5	,,	23	,, 18·1
16	,,	256	,, 5·5	,,	347	,, 13·6
17	,,	150	,, 8·4	,,	206	,, 16·9
18	,,	3	,, 13·9	,,	171	,, 15·1
19	,,	195	,, 14·8	,,	30	,, 15·6
20	,,	33	,, 10·5	,,	355	,, 16·5
21	,,	272	,, 5·1	,,	214	,, 14·1
22	,,	165	,, 9·4	,,	178	,, 17·7
23	,,	5	,, 14·4	,,	39	,, 12·6
24	,,	198	,, 14·4	,,	1	,, 18·8

THE TRANSIT OF MERCURY ON MAY 6.—The *Nautical Almanac* furnishes the usual elements of this phenomenon and the times of the contacts and of least distance of centres referred to the centre of the earth, with the necessary formulæ for reducing the moments of contact to any place upon the earth's surface. The following figures result for Greenwich, Edinburgh, and Dublin; Greenwich mean times at the respective observatories:—

	First External Contact. h. m. s.	First Internal Contact. h. m. s.
Greenwich	3 10 58	... ... 3 14 4
Edinburgh	3 11 0	... ... 3 14 6
Dublin	3 11 3	... ... 3 14 9

The least distance of the centres (4′ 47″) takes place at 6h. 58·5m. and, as the sun will set at 7h. 29m., 7h. 47m., and 7h. 36m. local mean times at these places respectively, rather more than half the transit will be visible. The final contacts may be well observed in America.

THE RADCLIFFE OBSERVATORY.—The Radcliffe Observer is again punctual in the distribution of his volume of Observations, Vol. xxxv., containing the work in the year 1875, having been in the hands of astronomers several weeks. The only new feature is the publication of observations of the solar spots; the distances from the sun's limbs are fixed by transits and by readings of the declination circle of the heliometer; descriptions and sketches of the forms of the spots are included. Nearly 1,200 stars were meridionally observed. At the end of the Introduction, Mr. Main has exhibited the apparent errors of Tabular R.A. of the moon's limbs, as given on the same day by the observers at Oxford and Greenwich in 1863 and 1864, and from 1870 to 1874 inclusive. As usual the meteorological observations taken at the Radcliffe Observatory are published in considerable detail.

THE HARVARD COLLEGE OBSERVATORY, U.S.—Prof. Pickering has issued a report of proceedings at this observatory during the year ended November 1, 1877, with an outline of the course of observations intended to be pursued in future with the 15-inch refractor and the meridian circle, the telescope of which has an aperture of eight inches. The newly-discovered satellites of Mars have been the objects to which most attention has been directed with the refractor, the observations consisting not only in a series of measures of positions and distances which Prof. Pickering believes to be second only to the very complete series obtained by the discoverer with the large Washington instrument, but in a numerous series of photometric comparisons with the planet on methods explained in the Report, by which the image of Mars was brought to the same degree of brightness as each satellite. It was remarked under favourable opportunities for comparison that the outer satellite did not partake of the red colour of Mars, which Prof. Pickering observes is "a curious result, and having an important value in any theory of the cause of the peculiar colour of Mars." The observations were not wholly reduced at the time the Report was issued, but an approximate reduction gave the diameter of the outer satellite about 5·9 miles, and that of the inner one, 6·5 miles. "As the darker colour of the outer satellite somewhat diminishes its light," it was considered safe to call it about six miles in diameter, and the inner satellite seven miles. These comparisons were made between August 27 and October 12. A large number of similar measurements of seven of the satellites of Saturn, including the very faint object, Hyperion, have also been obtained. Remarking that other classes of observation appear to be well cared for at various observatories in the United States (Dr. Peters being engaged in the determination of the small stars near the ecliptic, at Clinton; the great telescopes of Washington, Chicago, and Cincinnati, being used almost exclusively for micrometric measures; spectroscopy being the intended line of observation at Princeton College; and the telescopes of Mr. Rutherford and Dr. Draper being largely used for photographic purposes), Prof. Pickering intends to devote the Harvard refractor mainly to photometry as "a field almost wholly unexplored with large telescopes," in America or elsewhere. The meridian-circle appears to have been chiefly

employed in the determination of stars to the ninth magnitude inclusive in the zone included between + 50° and + 55° of declination, undertaken at the instance of the Astronomische Gesellschaft, and this work approaches a conclusion. Upwards of 40,000 observations have been made with the meridian-circle since it was mounted at the end of 1870. The personal establishment at Harvard College now consists of Prof. Edward C. Pickering, as director, assisted by Prof. Rogers, and Messrs. Searle, Waldo, and Upton. Vol. x. of the *Annals* of the Observatory has been published during the past year. Vol. ix., with photometric observations 1872–75, is to follow, and is nearly ready for issue.

GEOGRAPHICAL NOTES

THE ALBERT NYANZA.—In his recent examination of Albert Nyanza, to which we have already referred, Col. A. M. Mason examined every inlet or indentation of the coast-line. Starting from Magungo in the s.s. *Nyanza*, Col. Mason followed the western shore, and found it overhung by lofty mountains, notwithstanding which there seemed to be a large population. On the first day the party reached Nurswar, and on the next continued their route to the south-west; after a six hours' run, they found that the coast-line trended more to the south, forming a wide plain, which in some places was covered with very heavy, thick forests. On the third day they crossed a wide bay to Kavalee. Soon after leaving Kavalee, Col. Mason found that the coast-line turned to the eastward, and in two hours' time they reached a mass of ambatch (like Signor Gessi), and found the south end of the lake very shallow. In the south-west corner Col. Mason noticed a second large bay, and from a depression in the mountains and a thick line of forest, he fancied that there might be a river emptying into the lake at that point, but he could find no entrance, and this accorded with what he had been told at Kavalee, that no river joined the lake near there. On the morning of the fourth day, after entering a number of small, shallow bights, he finally reached a broad river, the waters of which were reddish in colour, with a slight northerly current. The width of the stream is about 400 yards, the banks high and well-defined, and clothed with forests. Col. Mason was only able to proceed up this river for one hour, owing to the shallowness of the water, and there seemed to be a mass of vegetation blocking the way to the south; to the south-east he observed an immense forest of date-palms, and to the south and south-west an undulating country, covered with large trees. After leaving this river he found that he had crossed the lake, and that their course turned to the northward. On both sides of the lake the mountains were found to diminish in altitude, and to the southward, at the foot of the lake and between the two ranges, was a large isolated mountain, which was found to be in N. lat. 1° 11′. It is clear, therefore, that Lake Albert does not extend, as has been asserted, to the first parallel of north latitude. In his northward course Col. Mason found that the mountains were not so high as on the western shore, and that in only one place were the cliffs as lofty as the highest on the opposite coast. There was a marked difference, too, in the vegetation; on the western shore the mountains are well covered with timber and verdure, and in many parts the natives have cleared places for cultivation, while on the east the mountains are barren, with neither timber nor vegetation. On the fifth day the party passed several large villages, one of which was said to be the residence of Kava Gonza, brother to Kaba Rega, and, soon after, the village of Tiaboa was reached, above which the country is flat, and the coast-line trends to the north. From his observations Col. Mason found that Kavalee, near the south-west angle of Lake Albert, was in N. lat. 1° 22′ 20″, and the south-east angle in N. lat. 1° 11′ 3″.

MR. STANLEY'S WORK.—Mr. Stanley is engaged in writing a full account of his most important journey across Africa; and at present he is doing so with characteristic energy. Already a large portion of his manuscript is in the printer's hands, and his work will doubtless be ready for publication in May next. Mr. Stanley carried with him through the whole of his arduous journey a heavy photographic apparatus, and succeeded in obtaining many very good negatives of views and groups on the great lakes and on the Congo. The interest of these pictures can scarcely be over-estimated. They will be reproduced as full-page woodcuts in the volumes, which will also contain an unusually large number of vivid scenes and incidents from excellent sketches made by Mr. Stanley himself. Perhaps the most important feature of the work will be the chart of the Congo, which has been so minutely and elaborately mapped, that it will require a scale of an inch and a half to a degree to embody in the smallest writing the information conveyed. Besides this large route map, which will be in two parts, the work will also contain several maps of a valuable and interesting character. The work will be published simultaneously, the *Publishers' Circular* informs us, or as nearly so as can be arranged, by Messrs. Sampson Low and Co. in England; by Messrs. Harper and Brothers, New York; in French by Messrs. Hachette and Co., Paris; in German by M. Brockhaus, Leipsic; in Danish by M. Mallings, of Christiania. Negotiations are also pending for translations into the Swedish, Spanish, Italian, and Russian languages. The title is, "Through the Dark Continent; the Sources of the Nile; around the Great Lakes, and down the Congo." We are pleased to see that the *Geographical Magazine* of this month handsomely acknowledges that its previous hard judgment on Mr. Stanley's conduct was unjustifiable.

SOUTH-WEST AFRICA.—In his monthly summary, Dr. Behm refers briefly to an important journey made by two Rhenish missionaries last summer between the Cunane river and 21° south lat. They found that the coast mountains, opposite Wallfisch Bay, extend far to the north-west, with a height of from 4,000 to 4,500 feet. The travellers have noted many important details in their map which will form an important supplement to existing maps of Africa, as the region traversed is almost unknown.

AFRICAN DWARFS.—Dr. O. Lenz contributes to the *Mittheilungen* of the Vienna Geographical Society for January an important paper on this subject. He describes his own observations on the Abongo of the Ogové, whose average height is 133-152 centimetres. Dr. Lenz concludes that all the dwarfish African peoples—the Abongo of the Ogové, the Dongo of the Sette River, the Bakke-Bakke of the Loango Coast—are only part of an original great negro people, who are also found in the interior under various names—as Kenkob in the Lufum country, Mala-Gilagé in the south of Bagirmi; and further east, as Akka, Doko, Berikomo, &c.; and that this great people, who were perhaps the aboriginal inhabitants, the true autochthones of equatorial Africa, have been supplanted and destroyed by other migratory peoples. Dr. Lenz places the Bushmen in a similar category.

THE NORTH-EAST PASSAGE.—Prof. Nordenskjöld and Mr. Dickson of Göteborg, recently paid a visit to Hull in order to make various preparations for their intended Arctic expedition. It is also announced that Lieut. Sandeberg intends to organise a scientific expedition to Kolgajeff, the Petchora, Hvideö, and the Siberian coast during the approaching summer; he has already hired a vessel for this purpose, and intends to be absent for about six months.

DR. LENZ.—The well-known African traveller, Dr Oskar Lenz, has been presented with the cross of the Albrecht Order by the King of Saxony.